Operating and Service Manual

MODEL

DC3001

PART NUMBER

1001782-501

SERIAL NUMBER

8665 / 1426

FORM 144 REV 1087

AMPLIFIER RESEARCH

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ML 1001782-501 MODEL DC3001

DESCRIPTIVE INFORMATION	SUPPORT DOCUMENTS
FREQUENCY 100KHZ-1000MHZ	TEST DATA SHEET 1001812
POWER OUT	TEST PROCEDURE
PRIMARY POWER	ENVELOPE DWG
COOLING NATURAL CONVECTION	SALES DATA SHEET - INFORMAL PRINTED
PACKAGE	MANUAL CLASS (SEE REVERSE SIDE)
OPTIONS INCLUDED	REMARKS

MATERIAL PULL INFORMATION												MANUAL INFO				
ASSY LEVEL								DESCRIPTION	QTY	ASSEMBLY NUMBER	S	PL	AS	SC	SCHEMATIC NUMBER	S
1	2	3	4	5	6	7	8									
X								COUPLER, DIRECTIONAL	1	1001782-101						

FORM 109 REV0378

AMPLIFIER RESEARCH

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MASTER LIST

OPERATING INSTRUCTIONS

MODEL DC3001

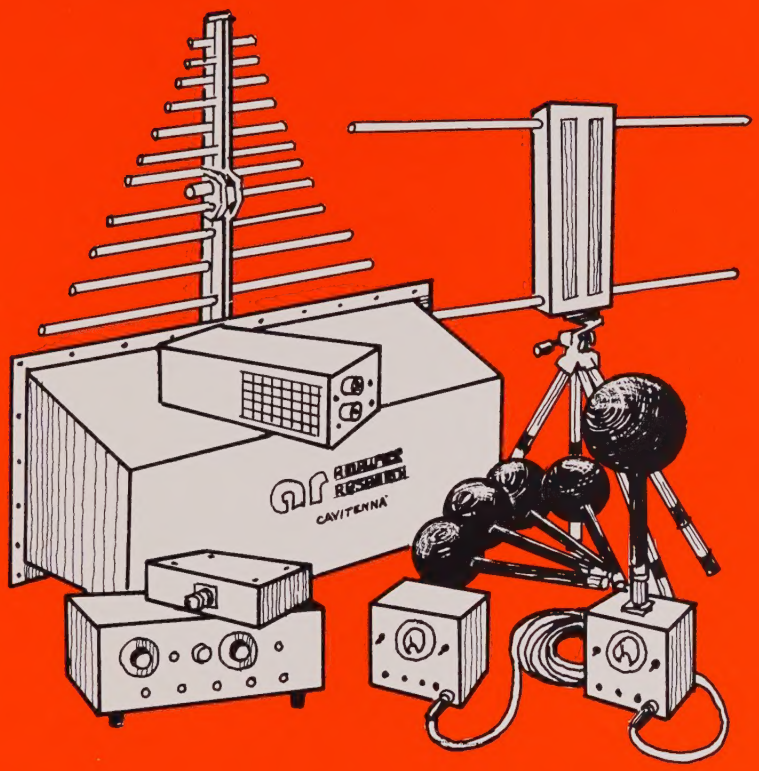
WARNING:

DO NOT EXCEED MAXIMUM POWER RATINGS.
DO NOT DROP. INTERNAL COMPONENTS ARE FRAGILE.

Operation of the Model DC3001 is quite simple. The input signal is fed into the jack (J1) marked Input and the output is taken from the Jack (J2) marked Output. The input and output jacks on the unit are Type N (Female).

Forward coupled output is taken from Jack (J3) marked FWD, and REVERSE coupled output is taken from Jack (J4) marked REV. Both coupled output jacks on the unit are Type BNC (Female).

See Specification Sheet for detailed specification.



Accessories for rf testing

- Directional couplers
- Interface modules
- Matching transformers
- Power combiner/dividers
- System assembly kits
- Leveling preamplifiers
- Field sensor systems
- Fiberoptic telemetry systems
- Antennas
- TEM cells

AMPLIFIER RESEARCH

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Directional Couplers

Model DC2000

- Dual-directional
- 10 kHz to 220 MHz, 2500 watts cw

Permits coupling of laboratory oscilloscopes, voltmeters, power meters, and spectrum analyzers to high-power broadband rf amplifiers and test systems, including those that employ our L series amplifiers (up to 2500 watts cw). Allows simultaneous monitoring of forward and reverse power, useful for amplifier leveling and load protection.

Model DC3000

- Single-directional
- 100 kHz to 1000 MHz, 50 watts cw

Provides excellent performance over its extremely broad bandwidth. Couples laboratory monitoring equipment to the forward-power output of up to 50-watt cw power amplifiers. Ideally suited for use with our ultrabroadband W series amplifiers. Compact and lightweight.

Model DC3001

- Dual-directional
- 100 kHz to 1000 MHz, 50 watts cw

Like the Model DC3000, this directional coupler performs very well over the same extremely broad bandwidth. Additionally, it has dual-directional capability, achieved with no increase in size or weight over the DC3000.

Model DC4000

- Dual-directional
- 10 kHz to 100 MHz, 15,000 watts cw

Specially designed for use in extremely high-power rf test systems. Dual-directional coupling capability. Compatible in operating bandwidth and power range with our highest-power Model 10,000L broadband amplifier.

Model DC5000

- Dual-directional
- 220-400 MHz, 2500 watts cw

The Model DC5000 dual-directional coupler extends performance characteristics similar to those of our popular Model DC2000 over the adjacent higher frequency range to 400 MHz. Its bandwidth and power-handling capabilities are compatible with those of our Series HA rf amplifiers.

Model DC6000

- Dual-directional
- 400-1000 MHz, 1500 watts cw

This dual-directional coupler serves the next higher frequency band, to 1000 MHz, immediately above that covered by the Model DC5000, and handles continuous power up to 1500 watts. It is compatible in power capability and bandwidth with our new Series HB amplifiers.

Specifications

	DC2000	DC3000	DC3001	DC4000	DC5000	DC6000
Frequency range	10 kHz-220 MHz	100 kHz-1000 MHz	100 kHz-1000 MHz	10 kHz-100 MHz	220-400 MHz	400-1000 Mhz
Power (max.)	2500 watts cw 5000 watts peak	50 watts cw 1000 watts peak	50 watts cw 1000 watts peak	15,000 watts cw 50,000 watts peak	2500 watts cw 5000 watts peak	1500 watts cw 3000 watts peak
Coupling factor	50 ±1 dB	40 ±0.6 dB	40 ±0.6 dB	60 ±1 dB	50 ±1 dB	50 ±1 dB
Directivity	25 dB typical 20 dB min.	25 dB typical 20 dB min.	25 dB typical 20 dB min.	25 dB typical 20 dB min.	25 dB typical 20 dB min.	25 dB typical 20 dB min.
Insertion loss	0.15 dB max.	0.3 dB max.	0.5 dB max.	0.1 dB max.	0.2 dB max.	0.2 dB max.
Impedance (main line)	50 ohms VSWR 1.2:1 max.	50 ohms VSWR 1.2:1 max.	50 ohms VSWR 1.3:1 max.	50 ohms VSWR 1.2:1 max.	50 ohms VSWR 1.05:1 max.	50 ohms VSWR 1.05:1 max.
Connectors **main line** **coupled**	 Type C female Type BNC female	 Type N female Type BNC female	 Type N female Type BNC female	 Type EIA flange 1⅝ in. Type BNC female	 Type C female Type BNC female	 Type C female Type BNC female
Weight (max.)	1.4 kg 3.0 lb	0.9 kg 2.0 lb	0.9 kg 2.0 lb	6.8 kg 15.0 lb	0.6 kg 1.2 lb	0.6 kg 1.2 lb
Size (approximate W × H × D)	26.6 x 8.1 x 7.6 cm 10.1 x 3.2 x 3.0 in.	12.7 x 5.1 x 3.8 cm 5.0 x 2.0 x 1.5 in.	12.7 x 5.1 x 3.8 cm 5.0 x 2.0 x 1.5 in.	25.4 x 10.2 x 10.2 cm 10.1 x 4.0 x 4.0 in.	8.3 x 3.2 x 5.2 cm 3.3 x 1.3 x 2.1 in.	8.3 x 3.2 x 5.2 cm 3.3 x 1.3 x 2.1 in.

Computer interface

Model CP2000

The Model CP2000 computer interface permits remote programmable-controller operation of Amplifier Research high-power L series amplifiers, and includes provisions for pulsing and blanking.

The interface responds to TTL-level signals, and is normally connected to a controller which is in turn controlled through an IEEE STD 488-1975 instrumentation bus. It provides complete electrical isolation between controller and amplifier, and eliminates ground loops and unwanted feedback.

Amplifier operating status—power on, standby, operate, pulse—is indicated by LEDs on the unit, which also furnishes this information to the controller for verification. Cables and connectors to amplifier are included. See specifications.

Specifications

Interface/programmer connector	25-pin subminiature D
Inputs	Four inputs to operate relay coils at TTL level, +5 Vdc @ 10 mA each. POWER ON, STANDBY, OPERATE, PULSE. One input for rf blanking drives an optical coupler at TTL level, +5 Vdc @ 10 mA. Turn-on delay: 2 microseconds maximum Turn-off delay: 3 microseconds maximum Minimum pulse width: 1 microsecond
Outputs	Four outputs are provided through optical couplers to verify amplifier response to the four control functions; POWER ON, STANDBY, OPERATE, PULSE. Will sink +5 Vdc @ 10 mA.
Interface/amplifier connector	Twenty-five feet of multi-conductor cable is furnished with matching connectors on each end to mate the computer interface unit to an amplifier. Blanking signals are transmitted through 25 feet of coaxial cable with BNC connectors on each end.
Status monitor	LED indicators are provided for the control functions; POWER ON, STANDBY, OPERATE, PULSE.

High-power rf matching transformers

Amplifier Research rf matching transformers permit matched impedance between our high-power broadband rf amplifiers (50-ohm output impedance) and instruments of related technologies requiring rf power such as ultrasonic generators, lasers, rf heaters, and many piezoelectric devices. Power ratings to 2000 watts cw, 5000 watts pulse.

Insertion loss..... 0.25 dB maximum
VSWR..... 1.3:1 maximum

Model	Frequency Range	Power Rating watts cw	watts pulse	Input impedance	connector	Output impedance	connector
MT1001	1-220 MHz	500	1500	50Ω	Type N	12.5Ω	screw terminals
MT1002	1-220 MHz	500	1500	50Ω	Type N	200Ω	screw terminals
MT1003	1-220 MHz	2000	5000	50Ω	Type C	12.5Ω	screw terminals
MT1004	1-220 MHz	2000	5000	50Ω	Type C	200Ω	screw terminals
MT1005	10kHz-10MHz	2000	5000	50Ω	Type C	12.5Ω	screw terminals
MT1006	10kHz-10MHz	2000	5000	50Ω	Type C	200Ω	screw terminals

Power combiner/dividers

Models PC1000 and PC2000, selected primarily according to power-handling capability, may be used either as power combiners or as dividers for general rf testing. They either combine the signals from four amplifiers or divide the signal from a single amplifier into four outputs. Ultra-broad operating bandwidth.

	Model PC1000		Model PC2000
Frequency range	at 1-1000 MHz	at 2-500 MHz	1-1000 MHz
Insertion loss			
typical	0.8 dB	0.6 dB	0.6 dB
maximum	1.2 dB	0.8 dB	1.0 dB
Coupling	−6 dB	−6 dB	−6 dB
Power at combined port	15 watts	25 watts	100 watts
Isolation			
typical	25 dB	30 dB	25 dB
minimum	20 dB	25 dB	20 dB
Impedance (all ports)	50 ohms	50 ohms	50 ohms
VSWR (maximum at all ports)	1.5:1	1.3:1	1.5:1
Phase unbalance (degrees maximum)	6	4	6
Connectors			
combined port	SMA female		N female
divided ports	SMA female		SMA female
Size (W x H x D)	5.1 x 5.1 x 12.7 cm 2.0 x 2.0 x 5.0 in.		12.7 x 5.9 x 15.3 cm 5.0 x 2.3 x 6.0 in.

Accessory kit

Model AK1000

The Model AK1000 accessory kit provides various test cables, connectors, and coax adapters useful for connecting Amplifier Research equipment into an rf test setup. This parts kit also includes special fuses not usually found in the normal laboratory. Excellent value. Convenience. Variety of connection possibilities.

Kit equipment:

Fabricated cables
2 - type C male to C male, 150 cm (RG-225/U cable)
1 - type C male to N male, 150 cm (RG-225/U cable)

Coax adapters
1 - type C male to type C male
1 - type C female to type C female
2 - type C male to type N female
4 - type N male to type BNC female
2 - type BNC male to type N female
2 - type BNC female to type BNC female
2 - type N female to type N female

Coax connectors
8 - type BNC male for RG-188A/U cable
8 - type BNC male for RG-142B/U cable
8 - type N male for RG-142B/U cable

Coax cable
10 meters - RG-188A/U coax cable
10 meters - RG-142B/U coax cable

Fuses (High-voltage for plate supplies)
5 - type BBS-5 (5 amps, 600 volts)

Lamps
6 — type 7374 — 28V

Leveling Preamplifiers

Model 777

10 kHz-220 MHz

The Model 777 solid-state leveling preamplifier provides up to 40 dB of gain control within an operational bandwidth of 10 kHz to 220 MHz for constant-field rfi susceptibility testing, power-output control, modulation envelope feedback, and simulation of current or voltage sources. Employing a front-panel attenuator that permits level adjustment of rf signal input, the Model 777 is compatible with a wide variety of rf sources, including function and sweep generators and frequency synthesizers.

It accepts a monitor input voltage of any polarity (positive, negative, or differential) from an electric-field sensor system (see page 7) or from the detected output of a directional coupler (page 9). A front-panel threshold control sets the level at which gain control is achieved. This versatile preamplifier is well suited for leveling Amplifier Research L series amplifiers, and the many other rf power amplifiers within its frequency range and power-output capabilities.

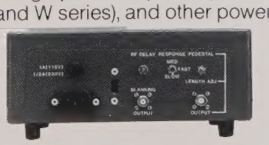
Model 999

1-1000 MHz
Blanking and pedestal outputs, rf delay

The Model 999 gated leveling preamplifier provides features similar to those of the Model 777 and more: rf gain control over an extended bandwidth of 1-1000 MHz (25 dB minimum, see specifications); pedestal output of adjustable width; blanking output; rf output delay (also adjustable) at the conclusion of a blanking pulse to permit the power amplifier to settle before an rf signal is again applied.

These blanking and pulsing features make the Model 999 particularly useful in NMR spectroscopy.

The Model 999 is compatible with all Amplifier Research broadband high-power amplifiers (including our ultrabroadband W series), and other power amplifiers within its bandwidth and power-output capabilities.

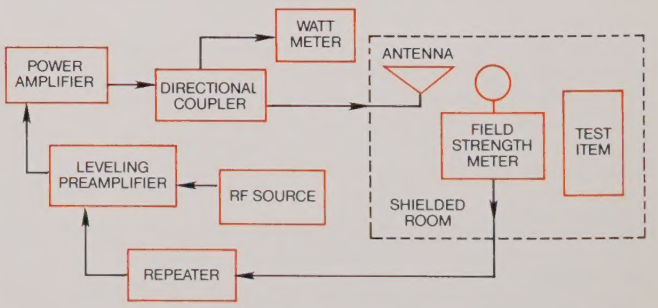


Specifications

	Model 777	Model 999
Rf characteristics		
Power output, minimum	10 milliwatts	10 milliwatts
Frequency range		
Full performance	10 kHz-220 MHz	1-1000 MHz
Reduced performance	5 kHz-300 MHz	
Flatness, maximum	±0.5 dB	±1.5 dB
Rf gain, minimum	10 dB	10 dB
Manual gain control, minimum	18 dB	20 dB
Harmonic distortion @ 10 milliwatts	Minus 25 dBc	Minus 25 dBc
Input and output impedance, nominal	50 ohms	50 ohms
Leveling characteristics		
Monitor input polarity	Plus, minus, or differential	Plus, minus, or differential
Threshold adjust range	Up to 5 V	Up to 5 V
Monitor input impedance, nominal	10,000 ohms	10,000 ohms
Closed-loop control of rf gain	40 dB to 200 MHz 27 dB to 250 MHz 23 dB to 300 MHz	25 dB minimum, 1-1000 MHz 40 dB typical, 5-500 MHz
Response	See note (1)	See note (1)
Pulsed characteristics		
Input pulse amplitude	---	+5 Vdc
Input impedance	---	50 ohms nominal
Rf envelope rise time (excluding rf delay)	---	0.5 microsecond
Rf envelope fall time	---	0.3 microsecond
Rf delay, adjustable (2) (5)	---	10 microsecond to 1 millisecond
Pedestal pulse amplitude (5)	---	−5 Vdc nominal into 50 ohms
Pedestal pulse length, adjustable (3) (5)	---	10 microseconds to 10 milliseconds
Blanking pulse output	---	+5 Vdc nominal into 50 ohms
Connectors	Type BNC female	Type BNC female
Primary power	115/230 Vac, 50/60 Hz	115/230 Vac, 50/60 Hz
Weight	2.3 kg (5 lb)	2.3 kg (5 lb)
Size (W x H x D) (4)	24.0 x 9.0 x 16.0 cm 9.5 x 3.5 x 6.3 in.	24.0 x 9.0 x 16.0 cm 9.5 x 3.5 x 6.3 in.

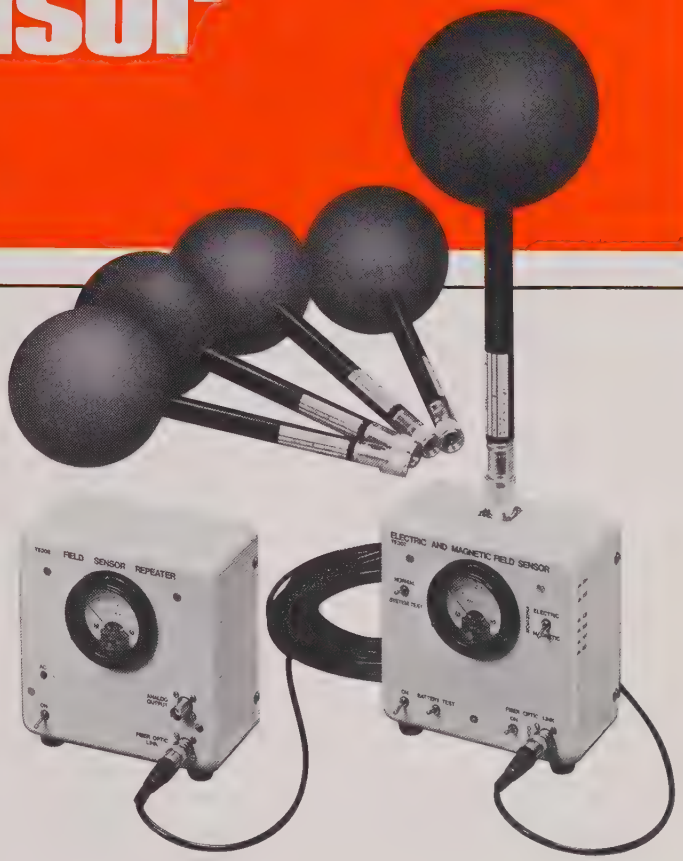
Notes:
(1) Response switch has multiple selection, which permits matching the detector response to avoid loop oscillation.
(2) RF-delay time starts at the end of the blanking pulse.
(3) Pedestal-pulse length starts at the end of the blanking pulse.
(4) Adapters available for 19-inch rack mounting. Requires 5¼ inch panel space.
(5) These outputs are used to interface with Amplifier Research amplifiers having pulse mode and/or blanking features.

Typical pulse rfi susceptibility test configuration



AERITALIA

Isotropic Field Sensor System



Sold and serviced in the U.S. by Amplifier Research, this full line of isotropic electric and magnetic field probes, when used with the Model 307TE1001-2 sensor and the Model 308TE1001-1 sensor-repeater, provides a broad selection of field-strength-measuring capabilities. These balanced isotropic probes respond to any incident field polarization, permitting the summing of all incident "E" or "H" fields sensed from all directions. The system renders highly effective measurement even in the HF and UHF near-field regions where power-density readings are less applicable. Sensor and repeater are connected via fiberoptic link. Components of the system can be purchased individually, as determined by user needs.

The 307TE1001-2 sensor comes with four rechargeable "D" cells and charger. The 308TE1001-1 repeater is line-powered at 115/230 Vac 50/60 Hz.

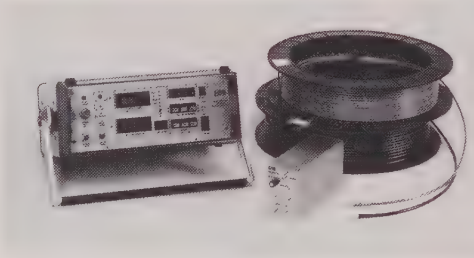
ELECTRIC AND MAGNETIC FIELD PROBES

											NEWEST MODELS		
Probe type		13RV1001-1	14RV1001-1	15RV1001-1	16RV1001-1	17RV1001-1	19RV1001-1	19RV1001-2	19RV1001-3	19RV1001-4	20RV1001-1	31RV1001-1	32RV1001-1
Field		Electric			Magnetic		Electric						
Frequency[1]	±1 dB	4-500 MHz	—	—	—	—	4 kHz-2 MHz (2)	4 kHz-1.5 MHz(3)	20 Hz-100 kHz	20 Hz-100 kHz	—	—	—
	±2 dB	—	—	—	2-100 MHz	2-100 MHz	—	—	—	—	—	2-800 MHz	—
	±3 dB	—	0.7-1000 MHz	1-500 MHz	—	—	3 kHz-2.5 MHz	3 kHz-2 MHz	20 Hz-200 kHz	20 Hz-200 kHz	3-200 MHz	—	0.5-500 MHz
Field strength range (full scale)		10 V/m	100 V/m	1,000 V/m	10 A/m	1 A/m	10/100/1,000 V/m	1/10/100 V/m	10/100/1,000 V/m	100/1,000/10,000 V/m	2 V/m	30 V/m	300 V/m
Calibration accuracy at calibration frequency		±0.5 dB											
Isotropic response		±1 dB		±3 dB	±2 dB		±1.5 dB				±1 dB		
Probe overload		90 V/m	900 V/m	2,000 V/m	15 A/m	9 A/m	– Not specified –				250 V/m	1500 V/m	

(1) By applying correction factors shown on supplied calibration curves, a combination of these probes can be used to cover the entire frequency range from 20 Hz to 1000 MHz
(2) 4 kHz-0.8 MHz and 3 kHz-1.2 MHz in the 1000 V/m switch position
(3) 4 kHz-600 kHz and 3 kHz-1 MHz in the 100 V/m switch position

ELECTRO OPTIC DEVELOPMENTS

Wideband Fiberoptic Links



Available from Amplifier Research are four fiberoptic telemetry systems for the transmission of wideband analog data in the presence of high-intensity emp and other electromagnetic fields as well as radioactive environments. When coupled with the appropriate sensor, these fiberoptic telemetry systems provide sensitive, high-speed, interference-free analog information transmission.

Each transmitter has four remotely selectable sensor inputs. All systems are equipped with battery-powered transmitter units, shielded to 100 kV/meter for operation in high-intensity emp and rf fields. Also included in standard systems are two rechargeable battery packs, one battery charger, and an ac-powered receiver/control unit (also shielded). Fiberoptic signal and control cables may be purchased in standard lengths up to 400 meters.

In FOL control units, input attenuation can be adjusted in 3 dB steps. FOL-S units have integral switchable attenuators, adjustable in 3 dB steps from 0 to 45 dB, and also a switchable active integrator with two time constants. IEEE 488 interface capability, which permits full control by a compatible instrumentation controller or computer, is standard on FOL-S systems, optional on FOL systems.

An Automatic Level Control (ALC) feature, unique to these systems, reduces problems normally created by poorly mated optical connectors and by other optical-link variations.

Specifications

Model	**FOL 500-4**	**FOL 500-4S**	**FOL 1000-4**	**FOL 1000-4S**
3 dB bandwidth: max. Lower min. Upper typ. Upper	2 kHz 500 MHz 650 MHz	1.2 kHz 550 MHz 650 MHz	10 kHz 1000 MHz 1100 MHz	1.2 kHz 1100 MHz 1100 MHz
SNR (p-p signal/rms noise) @ rated bandwidth, min.	40 dB	40 dB	36 dB	36 dB
Input sensitivity (to provide rated SNR)	20 mV p-p (30 dBm)	17.8 mV p-p (−31 dBm)	20 mV p-p (−30 dBm)	22.3 mV p-p (−29 dBm)
Output signal level (into 50 ohms)	500 mV p-p (−2 dBm)	400 mV p-p (−4 dBm)	250 mV p-p (−8 dBm)	250 mV p-p (−8 dBm)
System gain	28 dB	27 dB	22 dB	21 dB
Input attenuation	0-45 dB (3 dB steps)	0-45 dB (3 dB steps)	0-42 dB (3 dB steps)	0-45 dB (3 dB steps)
Active integrator time constants	N/A	1 μsec/10 μsec	N/A	1 μsec/10 μsec
Input/output impedance	50 ohm	50 ohm	50 ohm	50 ohm
Total harmonic distortion, max.	2%	2%	2%	2%
Pulse response overshoot, max.	5%	5%	10%	10%
Passband flatness	±0.5 dB	±0.5 dB	±1.0 dB	±1.0 dB
Calibration signal	1 MHz squarewave	100 kHz squarewave	1 MHz squarewave	100 kHz squarewave
ALC range (receiver typical)	5 dB optical power	5 dB optical power	5 dB optical power	5 dB optical power
Operating ambient transmitter and receiver fiberoptic cables	 −5 to +45°C −10 to +55°C	 0 to +45°C −10 to +55°C	 −5 to +45°C −10 to +55°C	 0 to +45°C −10 to +55°C
Operating time on transmitter battery packs continuous operation continuous on standby	 8 hours 500 hours	 8 hours 500 hours	 8 hours 500 hours	 8 hours 500 hours
Optical emitter	laser diode	laser diode	laser diode	laser diode
Optical detector	APD	APD	APD	APD
Mechanical details				
Transmitter unit Length Diameter Width Height Depth Weight, maximum	 190 mm 87 mm — — — 2 kg	 — — 70 mm 100 mm 190 mm 2.2 kg	 190 mm 87 mm — — — 2 kg	 — — 70 mm 100 mm 190 mm 2 2 kg
Receiver/control unit Width Height Depth Weight, maximum	 278 mm 110 mm 215 mm 5 kg	 364 mm 147 mm 262 mm 7 5 kg	 278 mm 110 mm 215 mm 5 kg	 364 mm 147 mm 262 mm 7 5 kg
Fiberoptic cable Standard length Maximum length	 50 m 400 m	 50 m 400 m	 50 m 400 m	 50 m 400 m

MODEL

AT1000

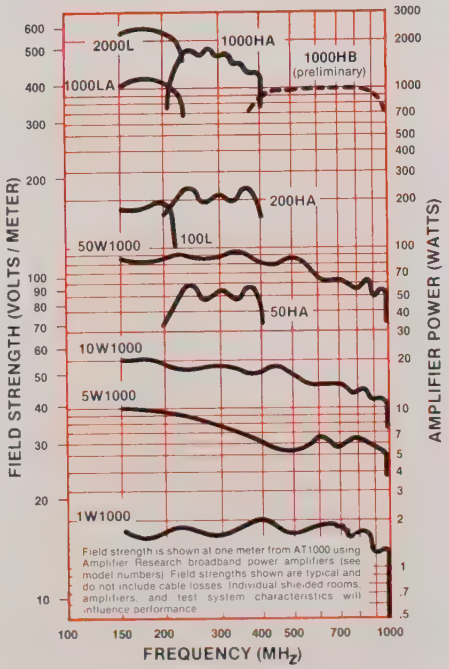
LOG-PERIODIC ANTENNA

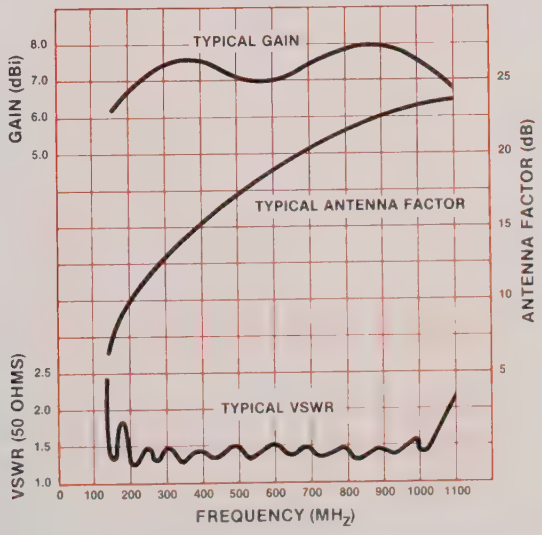
- ☐ 150-1000 MHz
- ☐ Up to 500 V/m
- ☐ Capacity 2000 W at 250 MHz

Our Model AT1000 is a wideband, high-gain, log-periodic antenna that provides field intensities of up to 500 V/m. With gain capabilities of 7.5 dB over isotropic (average) and gain flatness of ±1 dB, the Model AT1000 supplies the constant, high-intensity fields necessary for rfi/emi field testing within and beyond the confines of the shielded room. Compact and lightweight for ready mobility, yet built tough for the extra demands of outdoor use. Can also be used as a receiving antenna for rf emissions testing. Easily mounts on a flat surface or tripod.

Specifications

FREQUENCY RANGE	150 to 1000 MHz
POWER INPUT (maximum)	
150—250 MHz	2000 watts
250—500 MHz	1500 watts
500—1000 MHz	750 watts
POWER GAIN (over isotropic)	6.5 dB minimum 7.5 dB average
GAIN FLATNESS	±1.0 dB
IMPEDANCE	50 ohms nominal
VSWR	
maximum	1.8:1
average	1.5:1
BEAMWIDTH (average)	
E plane	60°
H plane	105°
FRONT TO BACK RATIO (minimum)	15 dB
CONNECTOR	type C female
SIZE (w x h x d)	102 cm x 13 cm x 91 cm (40 in x 5 in x 36 in)
WEIGHT (maximum)	7 kg (15 lb)
MOUNTING PROVISIONS	Wall bracket included; optional tripod available





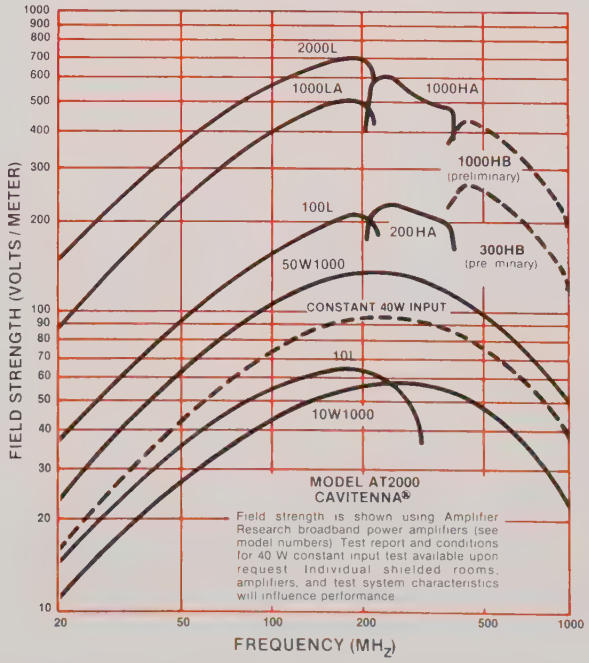
MODEL AT2000 CAVITENNA® Radiator

- ☐ Cavity-exciting/shielded room
- ☐ 30-1000 MHz
- ☐ 600+ V/m
- ☐ Up to 3500 watts

This is our "cavity exciter", the first rf antenna to make the shielded room an integral part of the radiator. The AT2000 takes advantage of the shielded room as a resonant cavity, and its ceiling or wall as the antenna's ground plane. The result—extremely high power accommodation and corresponding field intensities and broadband capabilities (30-1000 MHz) comparable to those of log-periodic antennas four times its size. Magnetic clamp mounting simplifies installation and relocation in the shielded room. Often used in fully automated testing configurations.

Specifications

FREQUENCY RANGE	30-1000 MHz
INPUT POWER (cw maximum)	
30-250 MHz	3500 watts
250-500 MHz	2000 watts
500-1000 MHz	1250 watts
IMPEDANCE	50 ohms nominal
CONNECTOR TYPE	type C female
ELECTRIC FIELD INTENSITY	See curves calculated using AR amplifier performance data. (For performance characteristics with other amplifiers, consult constant 40 W input curve.)
SIZE (w x h x d)	117 cm x 61 cm x 51 cm (46 in x 24 in x 20 in)
WEIGHT (maximum)	14 kg (30 lb)
MOUNTING PROVISIONS	Magnetic clamps included.



MODEL AT3000

"E"-FIELD GENERATOR

- ☐ 10 kHz to 30 MHz
- ☐ 1000 V/m between elements
- ☐ 100 V/m at 1 meter
- ☐ Up to 2000 watts

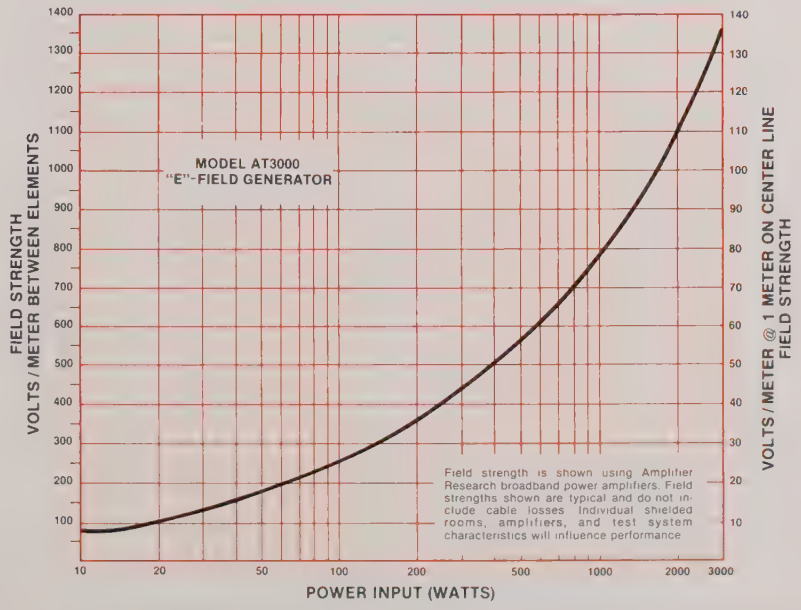
The AT3000 is our wideband (10 kHz to 30 MHz) "E"-field generator. It uses low-inductance, high-power internal load resistors to terminate rf drive power. Well-matched input VSWR and freedom from an external load are both benefits of this feature. The AT3000 also incorporates a broadband transformer into its design that contributes to increased output voltage. All of this within one totally self-contained unit makes the AT3000 unique among "E"-field generators. Small for easy handling within shielded rooms.

Optional forced-air cooling permits operation at power levels up to 3000 watts, and at higher duty cycles and longer "on" time (see specifications, opposite). A larger "E"-field generator, Model AT3001, is available on special order; request further information.

Specifications

OPERATING RANGE (maximum)				
	Without forced-air cooling		With forced-air cooling	
POWER (watts)	DUTY CYCLE (percent)	ON TIME (minutes)	DUTY CYCLE (percent)	ON TIME (minutes)
1000	100	continuous	100	continuous
1600	50	7	100	continuous
2000	25	3	100	continuous
3000	DO NOT USE		50	5

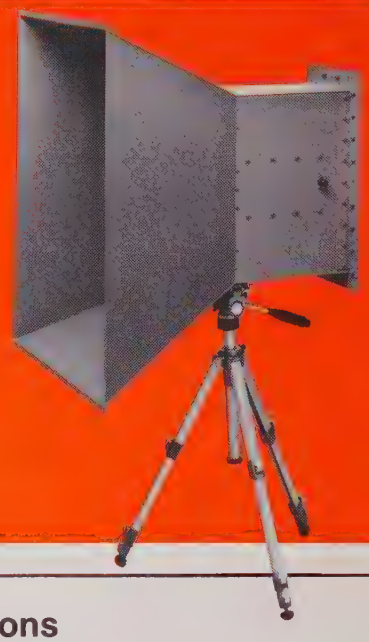
FREQUENCY RANGE . . . . . 10 kHz-30 MHz
IMPEDANCE . . . . . 50 ohms, VSWR 2.5:1 maximum
ELECTRIC FIELD INTENSITY . . . . . Up to 1000 volts/meter, see graph.
CONNECTORS . . . . . type C female
SIZE (w x h x d) . . . . . 188 cm x 72 cm x 7.0 cm (74 in x 28 in x 2.5 in)
WEIGHT (maximum) . . . . . 16 kg (35 lb)
MOUNTING PROVISIONS . . . . . Optional tripod available



MODEL AT4001

HIGH-GAIN HORN ANTENNA

- ☐ **400-1000 MHz**
- ☐ **More than 300 V/m from 300-watt input power**
- ☐ **Up to 1000 watts**



The Model AT4001 high-gain horn antenna exhibits increasing gain with increasing frequency (up to 15 dB at 1000 MHz). With this useful performance characteristic, the antenna helps compensate for losses that occur elsewhere in an rf test system—losses which generally increase with frequency.

The Model AT4001 is well suited for either shielded-room or free-space testing. Optimum performance is achieved when it is used with our new Series HB broadband rf amplifiers.

This versatile antenna works equally well as a radiator for rf susceptibility testing or as a receiving antenna for emissions testing.

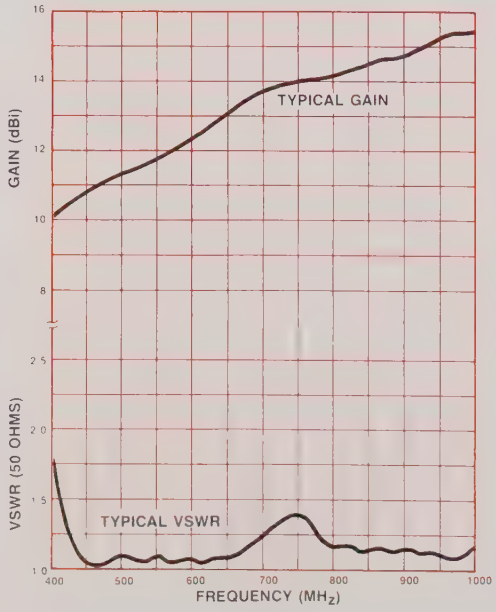
The field strengths shown on the chart below do not include allowances for cable losses, which can be high at the higher frequencies. Therefore, any cable runs greater than a few feet should be made with low-loss coaxial cable.

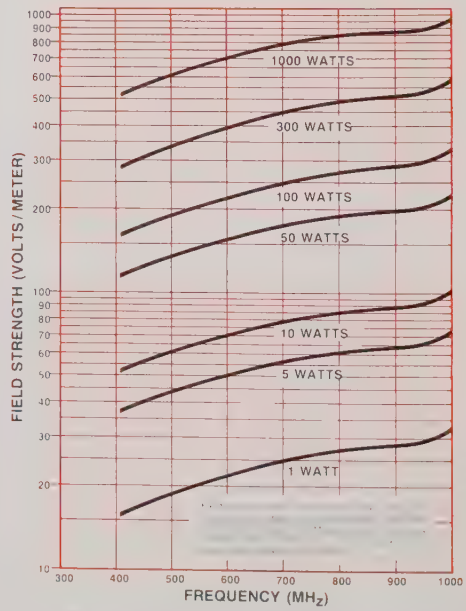
In shielded rooms, reflections and room losses will reduce the available field. Amplifier Research suggests a design safety factor of 100% in the selection of power amplifiers.

Specifications

FREQUENCY RANGE	400-1000 MHz*
POWER INPUT (maximum)	1000 watts
POWER GAIN	10 dB minimum, typically increasing to 15 dB at 1000 MHz *
IMPEDANCE	50 ohms nominal
VSWR	2.5:1 maximum 1.5:1 average
BEAMWIDTH (front to back)	Typical curves available on request.
CONNECTOR	Type C female
MOUNTING PROVISIONS	Rear flange for wall mount. Pads with ¼-20 thread for tripod mount.
WEIGHT (maximum)	9.1 kg (20 lb)
SIZE (w × h × d)	56.4 × 79.3 × 73.7 cm (22.2 × 31.2 × 29.0 in.)

*Model AT4000, with frequency range of 200-1000 MHz and 10 dB gain, is available on special order





TEM Cells

MODELS

TC0250 & TC0500

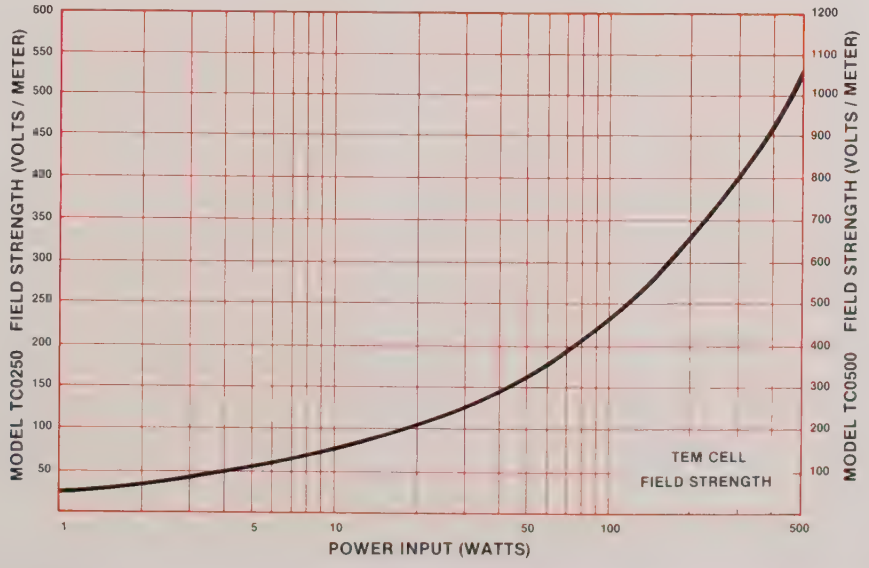
- ☐ Facilitate susceptibility and emissions testing.
- ☐ Provide highly stable and repeatable rf control environments.
- ☐ Can often eliminate large rf test area requirements.

The Model TC0250 and TC0500 TEM (transverse electromagnetic mode) cells are designed for susceptibility and emissions testing of small items. Because of their highly controllable and measurable characteristics as emi and rfi test chambers, both models are commonly used to calibrate electromagnetic and radio-frequency field-strength and power-density meters. The dimensions and taper of both the TC0250 and TC0500 TEM cells provide a 50-ohm impedance from end to end. When terminated in 50 ohms, a uniform high-impedance field approaching that of free space is produced throughout the test sample location. Because the Model TC0250 is twice the size of the Model TC0500, larger samples can be tested in the TC0250. This double size, however, causes the frequency range to be reduced by one-half; dc-250 MHz for the TC0250 and dc-500 MHz for the TC0500. See other specifications below.

Termination used with TEM Cells must have a load power equal to the input power. Our Model LR0500, 30 dB, 500 W attenuator is recommended as a termination. Use of such an attenuator provides an output which can be used for making power measurements or for providing a leveling control. (Information on request.)

Specifications

	TC 0250	TC 0500
Frequency range	dc to 250 MHz	dc to 500 MHz
Power input, Maximum	500 watts	500 watts
Impedance of cell	50 ohms	50 ohms
VSWR, Maximum	1.2:1	1.2:1 to 250 MHz 1.4:1 to 500 MHz
Connectors	type N female	type N female
Cell total width	2 meters	1 meter
Cell total height	60 cm	30 cm
Cell total depth	1 meter	50 cm
Septum depth	74 cm	37 cm
Maximum dimensions device under test (w x h x d)	30 cm x 10 cm x 20 cm	15 cm x 5 cm x 10 cm
Access ports		
Top, round, outer (diameter)	11 cm	11 cm
inner (diameter)	3 cm	3 cm
Side, round, outer (diameter)	11 cm	11 cm
inner (diameter)	3 cm	3 cm
Side, rectangular (w x h)	60 cm x 20 cm	30 cm x 13 cm



RF testing

Amplifier Research broadband power amplifiers are widely used by government and industry for research and rf testing. From 1 watt to 10 kilowatts, from 10 kHz to 1 GHz, they operate in cw, sweep, and pulse modes with no tuning required. And they can withstand the severest mismatch conditions without damage or shutdown.

Accessories include antennas, leveling preamplifiers, TEM cells, field-strength sensors, fiber-optic telemetry systems, and directional couplers, which enhance the capabilities of our rf amplifiers. Like our amplifiers, these accessories are used in highly specialized areas of rf testing, ranging from the development of new diagnostic methods for the health care industry to destructive testing for military purposes.

EMP testing

Amplifier Research is also the exclusive USA distributor for Elgal Electronics, a company sponsored by the Israeli Ministry of Defense. Elgal manufactures high-voltage pulse generators specially designed for EMP testing of electronic subsystems and components. They also manufacture a coaxial line chamber for measuring the rf-shielding effectiveness of materials in accordance with ASTM standards.

Call and tell us about your applications. Off-the-shelf or custom, you'll find AR equipment that meets your demand for rugged, dependable rf and EMP instrumentation.

AMPLIFIER RESEARCH

160 School House Road, Souderton, PA 18964-9990 USA
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Printed in U.S.A

REV 0487

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SERIAL NUMBER 1426

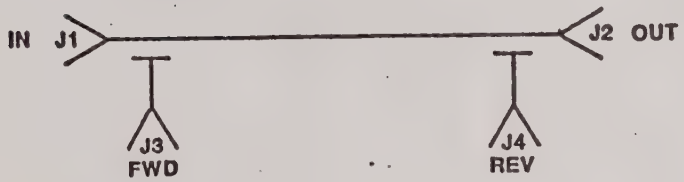
DATE JUL 11 1988

TESTED BY S.A.L.

TEST DATA SHEET

DUAL DIRECTIONAL COUPLER

MODEL DC3001



CHARTS ON FOLLOWING PAGE ARE
RELATED TO ABOVE DIAGRAM

DWG. 1001812
REV 0587

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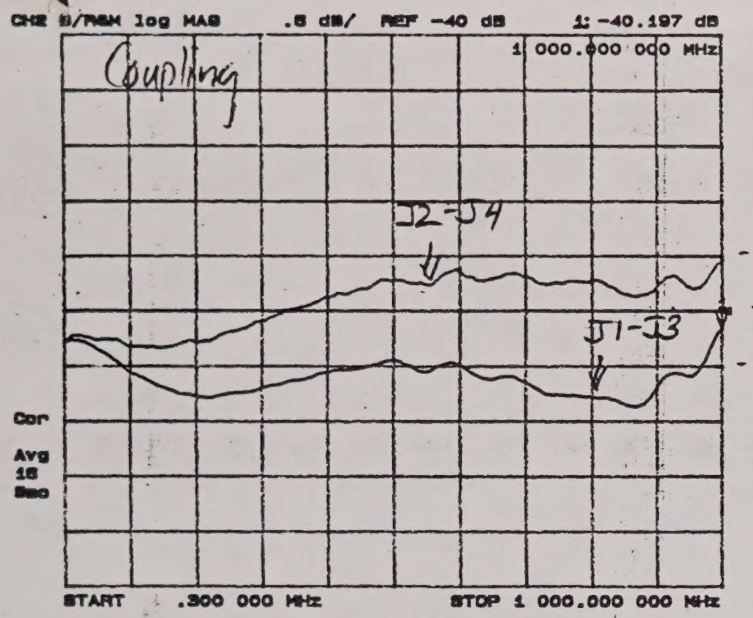
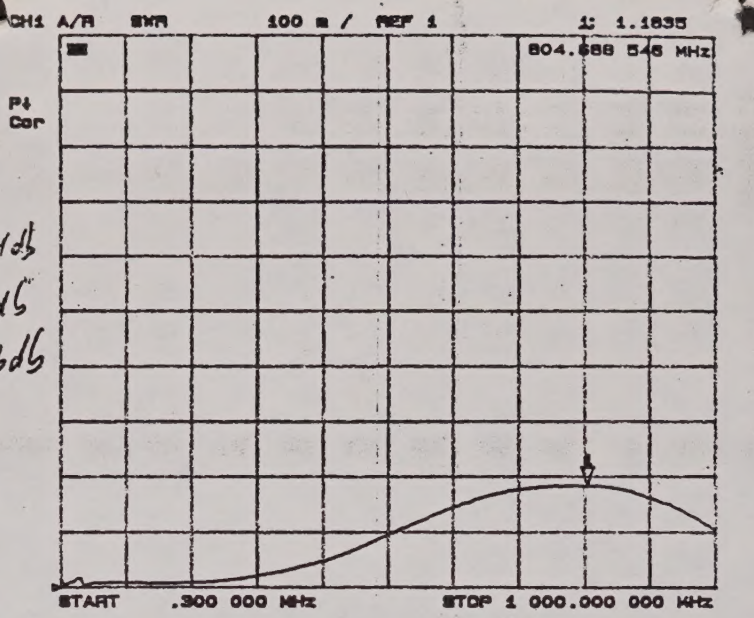
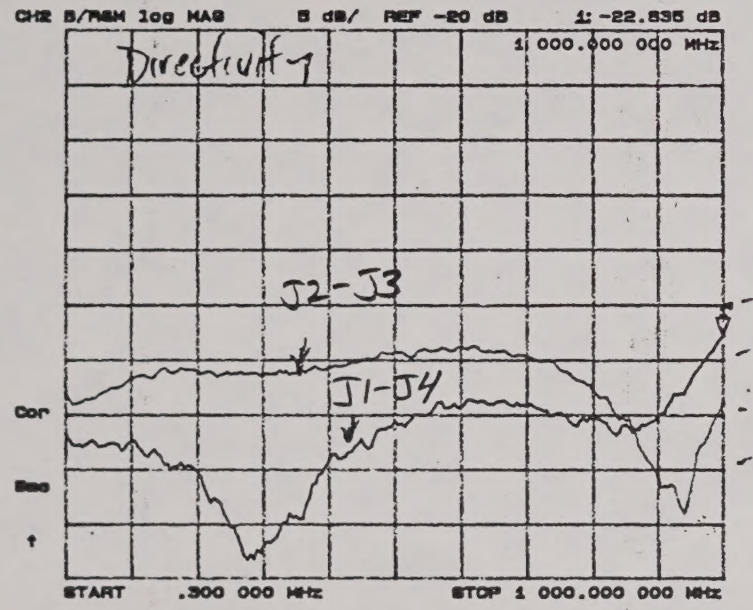
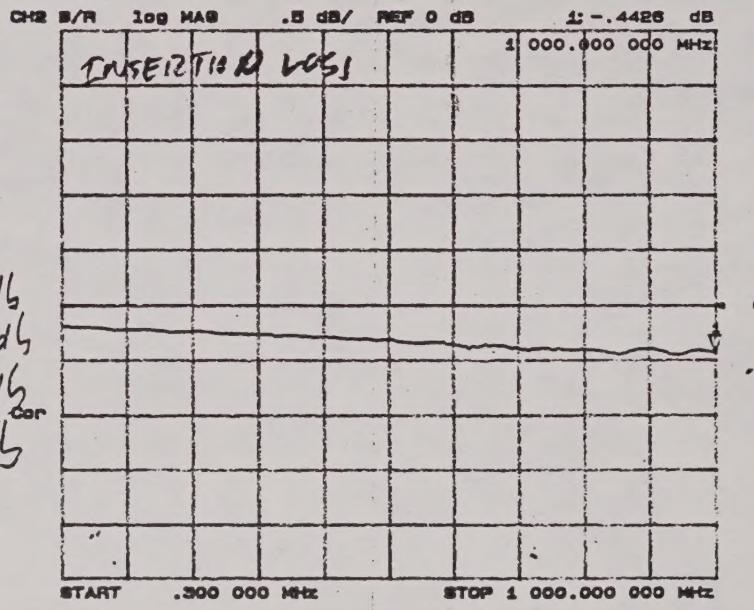

CH2 S/R&H log MAG .5 dB/ REF -40 dB 1: -40.197 dB
1 000.000 000 MHz
Coupling
J2-J4
J1-J3
-39.4dB
-40dB
-40.6dB
Cor
Avg 16 Sec
START .300 000 MHz
STOP 1 000.000 000 MHz


CH1 A/R SWR 100 m / REF 1 1: 1.1835
804.688 546 MHz
P4
Cor
START .300 000 MHz
STOP 1 000.000 000 MHz


CH2 S/R&H log MAG 5 dB/ REF -20 dB 1: -22.835 dB
1 000.000 000 MHz
Directivity
J2-J3
J1-J4
-20dB
-25dB
-30dB
-35dB
Cor
Cor
Sec
START .300 000 MHz
STOP 1 000.000 000 MHz


CH2 S/R log MAG .5 dB/ REF 0 dB 1: -.4426 dB
1 000.000 000 MHz
INSERTION LOSS
START .300 000 MHz
STOP 1 000.000 000 MHz

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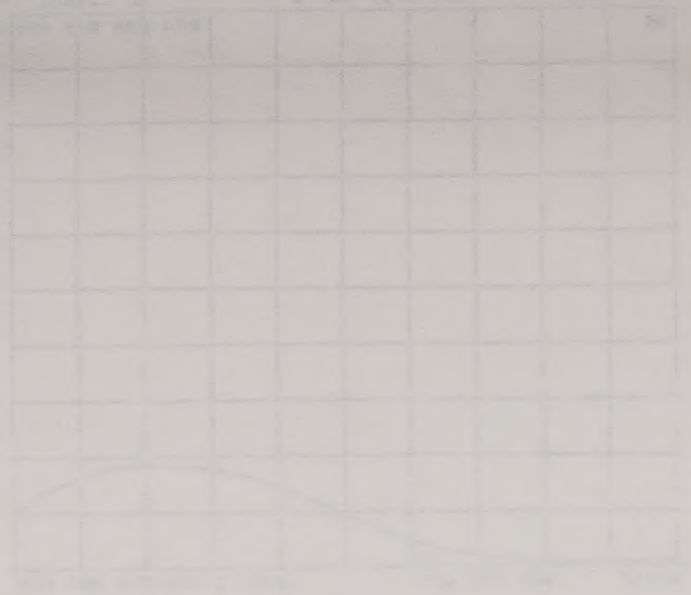

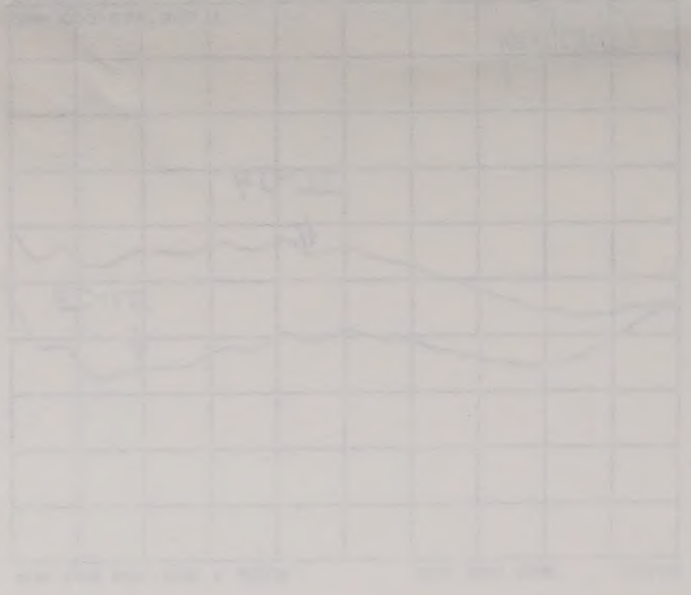

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